* APPENDIX D

SAMPLE FORM OF SYSTEM REQUIREMENTS DOCUMENT

D-l. Description. The following is a sample form of the System Requirements Document. It is intended to aid in the specifying of the system requirements. A completed version of this document, representing the requirements of a fictitious data acquisition system, can be found in REMR Technical Report REMR-CS-5, Report 1 Instrumentation Automation Techniques.

SYSTEM REQUIREMENTS DOCUMENT

_____
(Facility)

_____
(Contract)

_____
(System Name)

_____
(System Designer)

_____
(Date)

GENERAL FACILITY MISSION AND SYSTEM OBJECTIVES

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____ *

*

FUNCTIONAL AND ENVIRONMENTAL REQUIREMENTS

1. Physical phenomena/measurements. _____

   a. Range _____

   b Accuracy (total system) _____

   c. Resolution (total system) _____

   d Sample/interest rate: _____Continuous

   _____Intermittent _____Frequency

   e. Display (real-time): _____Yes _____No

   f Store/record: _____Yes _____No

   g. Number of measurements _____

   h. Alarm: _____Yes _____No

   Limits: _____Low _____High

   i. Criticality: _____High _____Average _____Low

2. Sensor/detector/transducer.

   Type_____

   Sensitivity Nonlinearity_____Hysteresis _____

   Accuracy_____Resolution_____Range_____

   Maximum Residual Unbalance (zero offset) _____

   Temperature Compensation: _____Yes _____No

   Excitation Power: _____V _____AC _____DC

   _____A _____Reg. ____Unreg. ____Hz

   Number of Instruments_____

*

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Protective enclosure: _____Yes _____No

Mechanical

Physical dimensions _____

Mounting _____ Spatial_____

3. Signal Conditioner/Converter

a. Amplifier

No. of channels_____

Single-ended _____ Differential_____

Gain-Fixed _____ Variable _____ Range _____

Automatic/Manual _____

Accuracy _____ Bandwidth _____

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Protective enclosure: _____Yes _____No

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____ *

* b* Filter

Type: Low-pass _____ High-pass _____ Band-pass _____

Cut-off Frequency _____ Fixed _____ Variable _____

No. of channels _____

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Protective enclosure: _____Yes _____No

Mechanical

Physical dimensions _____

Mounting_____ Spatial _____

c. Balance _____ Offset _____ Compensation _____

d. Multiplexer

1. Analog: Low level _____ High level _____

No. of inputs per output _____

Input: Single-ended _____ Differential _____

Input voltage range _____ Sample rate _____

2. Digital: Parallel _____ Serial_____

Bits/word _____ No. of channels _____

Address code type _____ (BCD, binary, etc.)

Logic levels: High_____v Low_____V

Logic convention: Positive _____ Negative_____

Sample rate _____

* Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Protective enclosure: _____Yes _____No

Mechanical

Physical dimensions _____

Mounting_____ Spatial _____

e. Signal Converter

Type: Analog-to-Digital (A/D) _____

Input range_____V Conversion speed _____usec

Bits of resolution _____

Digital-to-Analog (D/A) _____

Bits of resolution _____ Conv speed _____usec

Output Range _____

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

f. Sensor Power Source: _____ Yes _____No

AC _____ DC _____ Hz _____ Reg _____ Unreg _____ *

Voltage _____ Amperage _____ Backup: _____Yes _____No

Battery _____ UPS _____ Solar _____

Environmental

Operating temp_____ Humidity _____

Shock/Vibration_____ Other hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

g. Transmission Link

Wire/cable _____ Telemetry _____Telephone Modem _____

Fiber-optic _____Other _____

Environmental

Operating temp_____ Humidity _____

Shock/Vibration _____ Other hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

4. Data Processor/Storage/Monitor

a. Computer

Purpose: Data acquisition _____ Process control _____

Data reduction _____ Computation _____

Other _____

1. Peripherals: Monitor _____ Plotter _____

   Printer _____ Mag. tape _____ Modem _____

   Terminal_____ Disk drive _____ Floppy disk _____

   Hard disk _____

2. No. of input data channels _____

   Analog _____ Digital _____

3. Main Memory: Type _____ Capacity _____

4. Communications: I/O port(s); 4-20mA _____

   IEEE-488 _____ RS-232-C ____ RS-422 ____ RS-449____

   16-bit parallel _____

5. Power: Primary _____ Backup _____

   _____V AC_____ DC_____ Amps_____ Freq_____

   Backup: Battery _____ UPS _____ Solar _____

   Available: _____ Yes _____ No

6. Grounding scheme _____

7. Network configuration _____

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Cooling rqmnts _____ Dehumidification _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

Portable _____ Fixed _____

b. Data Logger

Data input: Analog __ Digital __ Sample rate _____

Hard copy _____ Internal storage _____ Memory cap. _____

Resolution _____

Remote communications: Modem ____ RF ___ I/O _____

Alarm: Audible _____ Visual _____

Power: Primary _____ Backup _____

_____V _____AC _____DC _____Amps _____Hz

Backup: Battery _____ UPS _____ Solar _____

Available: _____Yes _____No

Grounding scheme _____

Environmental

Operating temp _____ Humidity _____

Shock/Vibration____ Other hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

Portable _____ Fixed _____

c. Storage Devices: Disk drives _____ Mag tape units _____

1. Disk drives: Avg access time _____

Unit capacity _____ Controller _____

Floppy _____ Hard _____ Fixed _____ Removable _____

Power: Primary _____ Backup _____

_____V_____AC _____DC _____Amps _____Hz

Backup: Battery _____ UPS _____ Solar_____

Available _____Yes _____No

Grounding scheme _____

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other Hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

Portable _____ Fixed _____

2. Magnetic tape unit:

Bits per inch (BPI) _____ Tape speed _____ips

7-track _____ g-track _____ Reel Size _____

Tape width _____

Power: Primary _____ Backup _____

_____V_____AC _____DC _____Amps _____Hz

Backup: Battery _____ UPS _____ Solar _____

Available _____Yes _____No

Grounding scheme _____

* Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

Portable _____ Fixed _____

5. Displays/Alarms

a. Cathode Ray Tube (CRT)

1. Resolution: _____High _____

Video: _____Composite _____RGB

Screen size _____Color _____ Monochrome _____

Power: Primary _____ Backup _____

_____V _____AC _____DC _____Amps _____Hz

Backup: Battery _____ UPS _____ Solar _____

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

Portable _____ Fixed _____ *

*

b. Printer

Type: Character _____ Line _____

Letter quality _____ Dot matrix _____

Communications port: Serial _____ Parallel _____

Data buffer: _____Yes _____No

Paper: _____Tractor feed _____Friction feed

Fan fold _____ Roll _____ Size _____

Type font(s) _____

Power: Primary _____ Backup _____

_____V _____AC _____DC _____Amps _____Hz

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

Portable _____ Fixed _____

c. Plotter(s)

Type: Roll _____ Flat bed _____

Plot size _____ No. of pens _____

Communications port: Serial _____ Parallel _____

Data buffer: _____Yes _____No *

Paper size _____ Fonts _____

Power: Primary _____ Backup _____

_____V _____AC _____DC _____Amps _____Hz

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

Portable _____ Fixed _____

d. Strip chart recorder(s)

Type: Pen & ink ____ Heated stylus _____ Point plot

Signal input: Sensitivity Freq. response _____

No. of channels _____

Power: Primary _____ Backup _____

_____V _____AC _____DC _____Amps _____Hz

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____

Mechanical

Physical dimensions _____

Mounting _____ Spatial _____

Portable _____ Fixed _____

* e. Indicators

Type: 1. Status: LED ____ Incandescent _____

Other _____

2. Information: Digital____ Analog ____

LED _____ LCD _____ Dial/Meter _____

Gas discharge _____ Pointer/Scale _____

Other _____

Power: Primary _____ Backup _____

_____V_____AC _____DC _____Amps _____Hz

Environmental

Operating temp _____ Humidity _____

Shock/Vibration_____ Other hazards _____

f. Alarms

Type: Audible _____ Visual _____ Remote _____

Local _____

Power: Primary _____ Backup _____

_____V_____AC _____DC _____Amps _____Hz

Environmental

Operating temp _____ Humidity _____

Shock/Vibration _____ Other hazards _____ *

*U.S. Government Printing Office: 1987 517-494/62812